

What is claimed is:

1. A reactor structural member comprising:
a surface adapted to be located in a reactor water of
a nuclear reactor; and

a corrosion potential reducing substance provided on
the surface, the corrosion potential reducing substance being
selected from the group consisting of a photocatalytic
substance which produces an electromotive force under an
irradiation of a light or a radioactive ray in the nuclear
reactor and a metal ²or a metal ³compound which forms the
photocatalytic substance under a condition specified by a
temperature and a pressure in the nuclear reactor.

2. The reactor structural member according to claim
1, wherein the corrosion potential reducing substance is
formed as a particle having a surface on which at least one
of Pt, Rh, Ru and Pd is provided.

3. The reactor structural member according to claim
1, wherein the light in the nuclear reactor is a Cherenkov
ray produced in a water-cooled nuclear reactor. *inherent*

4. The reactor structural member according to claim
1, wherein the photocatalytic substance has a property of
an n-type semiconductor.

5. The reactor structural member according to claim
1, wherein the corrosion potential reducing substance is made
to adhere to or to form a film on the surface of the reactor
structural member.

6. The reactor structural member according to claim
1, wherein a mass or a thickness of the corrosion potential
reducing substance is designed so that a current produced
by the photocatalytic substance under the irradiation of the
light or the radioactive ray is not lower than a sum of
threshold current densities of an oxygen and a hydrogen
peroxide contained in the reactor water.

7. The reactor structural member according to claim
1, wherein the photocatalytic substance is one or more
compound selected from the group consisting of TiO_2 , ZrO_2 ,
 PbO , BaTiO_3 , Bi_2O_3 , ZnO , WO_3 , SrTiO_3 , Fe_2O_3 , FeTiO_3 , KTaO_3 , MnTiO_3

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10. A method of suppressing a corrosion of a reactor structural member, comprising:

11. The method according to claim 10, wherein the corrosion potential reducing substance is formed as a particle having a surface on which at least one of Pt, Rh, Ru and Pd is provided.

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16. The method according to claim 10, wherein the corrosion potential reducing substance is made to adhere to or is deposited on the surface of the reactor structural member by spraying, thermal spraying, physical vapor deposition or chemical vapor deposition.



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by a chemical decontamination process, an electrolytic decontamination process or a laser decontamination process.

22. The method according to claim 21, wherein the outer layer having a property of an n-type semiconductor is removed by irradiating the outer layer with a laser light in a water.

23. The method according to claim 10, wherein a loose deposition of a hematite on a surface of a nuclear fuel is suppressed by controlling an iron concentration of a feedwater in the nuclear reactor by a purifier placed in a condensing system of the nuclear reactor.

24. The method according to claim 23, wherein the purifier includes a filter device and a demineralizer device.

25. The method according to claim 10, wherein a hydrogen or a methanol is injected through a feedwater system of the nuclear reactor into a reactor water.

26. A method of suppressing a corrosion of a reactor structural member, comprising:

controlling an iron concentration of a feedwater in the nuclear reactor so that a hematite in a loose deposition is not produced on a surface of a nuclear fuel;

depositing at least one of Pt, Rh, Ru and Pd on a corrosion oxide film formed on a surface of the reactor structural member in a mass per unit area of $0.1 \mu\text{g}/\text{cm}^2$; and

controlling a quality of a reactor water so that the reactor water has an oxygen/hydrogen molar ratio in a range of 0.4 to 0.5.

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